COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT AND PROPOSAL TO AMEND TEN NATIONAL FOREST LAND MANAGEMENT PLANS

Southwest Center for Biological Diversity
Forest Conservation Council
The Grand Canyon Chapter of the Sierra Club
Northern Arizona Audubon Society
Maricopa Audubon Society
Forest Guardians
Carson Forest Watch

Prepared By:
Kieran Suckling, Southwest Center for Biological Diversity
Jim Martin, Land and Water Fund
John Talberth, Forest Conservation Council

THE SOUTHWEST CENTER FOR BIOLOGICAL DIVERSITY

New Mexico Office

December 1, 1994

Charles Cartwright
Regional Forester,
USDA Forest Service, Southwestern Region
517 Gold Avenue, SW
Albuquerque, NM 87102

Dear Mr. Cartwright,

Enclosed are comments on the Region's Draft Environmental Impact Statement and proposal to amend 10 Forest Plans submitted by the Southwest Center for Biological Diversity, Forest Conservation Council, the Grand Canyon Chapter of the Sierra Club, Northern Arizona Audubon Society, Maricopa Audubon Society, and Carson Forest Watch.

We appreciate the opportunity to comment but are very disappointed by the intent of the proposal and the very poor quality of the environmental analysis.

At a time when the Region is in need of new direction and a comprehensive ecosystem based approach to Forest management, it is instead attempting to codify existing single species management plans which have already been scientifically discredited. If the FEIS continues

Charlie Babbitt
Maricopa Audubon Society
4735 N. 53rd St.
Phoenix, AZ 85018

Joannie Berde
Carson Forest Watch
P.O. Box 15
Llano, NM 87543

Sam Hitt
Forest Guardians
612 Old Santa Fe Trail, Suite B
Santa Fe, NM 87501

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LEGAL ISSUES

1. THE FOREST SERVICE VOLUNTARILY ENTERED INTO SETTLEMENT

[redacted]

added). Third, paragraph 6(c) committed the Supervisor to "consult and involve the parties to this agreement in the preparation and design of any treatments, proposed or contemplated, for the lands allocated for old growth habitats in Table 19 of the Forest Plan." Fourth and finally, the parties, including the Forest Service, agreed to amend the initial Forest Plan so that it would preclude any silvicultural treatment in those blocks allocated for management of their old-growth characteristics.

These provisions represent only a small part of the commitments that the appellants, appellees, and the intervenors made to each other and enshrined in the settlement agreement.[1] However, in propounding its proposed amendment to the Kaibab Forest Plan, the Forest Service has breached each and every one of these, and numerous other, commitments that it solemnly undertook in the settlement agreement. In particular, the Forest Service now proposes to eliminate the standards and guidelines putting the old growth blocks identified in Table 19 of the 1990 Plan off limits to silvicultural treatment, and proposes to enter all of these old growth blocks. That proposal is fundamentally and profoundly at odds with the letter and spirit of the settlement agreement.

Apparently, the Forest Service now desires to unilaterally rescind the settlement agreement. As a result, we are compelled to note that a settlement agreement to resolve a dispute short of litigation is a contract, *Village of Kaktovik v. Watt*, 689 F.2d 222 (D.C. Cir 1982), and it may not be unilaterally rescinded. In this case, the Forest Service can not sincerely suggest that a factual dispute surrounded the formation or the terms of the settlement agreement, or that elements of either fraud or duress were present at the time that the Forest Service entered into this agreement. Consequently, the law is abundantly clear that the Forest Service may not unilaterally repudiate the agreement merely because it is now inconvenient to conform its behavior to the standards to which it committed itself a mere four years ago. *See Ibarra v. Texas Employment Comm'n*, 645 F. Supp. 1060, 1067 (E.D. Tex. 1986)

The law treats an agreement such as the one at issue here as a contract, and grants a strong presumption in favor of the enforceability of such agreements. *Jeff v. Andrus*, 888 F.2d 617, 623 (9th Cir. 1989).[2] "Upon anticipatory breach of a settlement contract, therefore, the non-breaching party must choose either to enforce the agreement and perhaps also recover damages resulting from its breach, or to litigate the merits." *Village of Kaktovik*, 689 F.2d at 231. In this case, the Sierra Club and the Audubon Society urge the Forest Service to return to its original promise to fully consult with all parties to the settlement agreement rather than

[1]The appellants and intervenors agreed to abandon their appeals of certain issues, while the Forest Service agreed to modify its Forest Plan (producing another version, referred to as the 1990 Plan). Mutuality of

unilaterally repudiating this contract.[3] The proposed amendment to the Kaibab Forest Plan should be withdrawn pending such consultation, or the proposal should be revised to eliminate any conflict with the terms of the agreement. The same result should obtain in the case of the Apache-Sitgreaves Forest Plan.

II. THE FOREST SERVICE HAS A DUTY, UNDER THE ENDANGERED SPECIES ACT, TO CONSULT WITH THE FISH AND WILDLIFE SERVICE CONCERNING THE MEXICAN SPOTTED OWL

On March 16, 1993, the Mexican spotted owl was listed as a threatened species by the U.S. Fish and Wildlife Service, pursuant to the Endangered Species Act of 1973, as amended. 16 U.S.C. § 1531-1543. The Forest Service concedes that the Mexican Spotted Owl is found throughout the national forests of New Mexico and Arizona.

According to the Fish and Wildlife Service, the spotted owl occupies a variety of vegetative habitats, but these tend to have several characteristics in common:

> These characteristics include high canopy closure, high stand density, and a multilayered canopy resulting from an uneven-aged stand. Other characteristics include downed logs, snags, and mistletoe infection that are indicative of an old grove and absence of active management. Much of the owl habitat is characterized by steep slopes and canyons with rocky cliffs.

58 Fed. Reg. 14248, 14249 (March 16, 1993).

In its status report on the spotted owl, the Service also noted that owl habitat is typified by high stand density, and explained that mistletoe infections in older Douglas firs provide thatches for nesting platforms. U.S. Fish and Wildlife Service, *Mexican Spotted Owl Status Review* 27 (1991). The status report reiterated that "[t]he habitat characteristics of high canopy closure, high stand density, a multilayered canopy, uneven-aged stands, numerous snags, and downed woody matter are best expressed in old-growth mixed conifer forests (200+ years old)." *Id.* at 28.

After noting that past timber harvesting practices on national forest lands had, in large part, contributed to the Mexican spotted owl's current threatened status, the Fish and Wildlife Service emphasized that the majority of Mexican spotted owls are closely associated with mature to old-growth stands, which are often infected with dwarf mistletoe. 58 Fed. Reg. at 14258. Indeed, the Fish and Wildlife Service admonished that although these conditions historically have motivated the Forest Service and the timber industry to remove the oldest remaining stands in the name of forest health, "these stands are extremely valuable to the Mexican spotted owl and other wildlife species and are in short supply." Id.

[3]Important public policies militate in favor of such a course. If the Forest Service unilaterally repudiates this agreement, it is unlikely that the parties to the agreement -- or any other citizen groups -- will soon agree to resolve an appeal or any other dispute through a settlement agreement. The result will be an increase in litigation and the acrimony that inevitably surrounds such forms of dispute resolution.

Despite these warnings, the Forest Service's proposed Forest Plan amendments would, among other things, (a) reduce both stand density and canopy cover, (b) in many cases remove the understory found in Ponderosa pine and mixed conifer forest stands and in other cases remove stands of mature and old growth trees to promote "regeneration," (c) "treat" stands heavily infected with mistletoe, and (d) impose intense silvicultural management on much of the old growth remaining on the national forests.

The conservation groups submitting these comments are not alone in asserting that the Forest Service's proposed action would adversely affect the habitat characteristics upon which the Mexican spotted owl depends. The Arizona Game and Fish Department (AGFD) has thoroughly detailed the correlation between maintenance of old growth, snag recruitment, mitigation corridors, and other attributes of old groves to a number of wildlife species, including the Mexican spotted owl. The AGFD also pointed out, in unusually strong terms, the risks that implementation of the Forest Service's preferred management regime would entail for the continued existence of the Mexican spotted owl. *See generally* Arizona Game and Fish Department, *Review of U.S. Forest Service Strategy for Managing Northern Goshawk Habitat in the Southwestern United States* at 31, 42 (1993).

A. The Forest Service Must Prepare a Biological Assessment

The implications of these facts are several and beyond dispute. First, the law is abundantly clear that "[o]nce an agency is aware that an endangered species may be present in the area of its proposed action, the [Endangered Species Act] requires it to prepare a biological assessment to determine whether the proposed action is 'likely to affect' the species and therefore requires formal consultation with the Fish and Wildlife Service." *Thomas v. Peterson*, 752 F.2d 754, 763 (9th Cir. 1985); 16 U.S.C. § 1536(c).

In this case, the Forest Service has neither completed a biological assessment nor initiated consultation with the Fish and Wildlife Service. The Forest Service should, as a consequence, be aware that a failure to so consult constitutes a substantial procedural violation of the Endangered Species Act. *Thomas v. Peterson*, 752 F.2d at 764.

B. The Issuance of a Proposed Amendment to the Forest Plans Constitutes Agency Action

The Forest Service has, in the past, attempted to skirt the mandatory requirements of the Endangered Species Act (ESA) by suggesting that a Forest Plan does not trigger the ESA. The law is clear and to the contrary.

The language of the statute is the starting, and ending, point for this analysis. The Act states that "[e]ach Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action ... carried out by such agency ... is not likely to jeopardize the continued existence of any ... threatened species or result in the destruction or adverse modification of habitat of such species." 16 U.S.C. §1536(a)(1)(emphasis added). In an effort to assure that agencies do not inadvertently take such an action, if the agency learns from the Secretary of the Interior that a listed species is found in the vicinity, the agency must first conduct a biological assessment to determine whether the listed species is "likely to be affected by such action." 16 U.S.C. § 1536(c).

The statute's language is clear and admits of no exceptions pertinent here. Adoption of a significant amendment to the forest plans for forests throughout the region cannot help but fall within the ambit of "any action" to be carried out by an agency of the federal government. The need for a biological assessment -- and, virtually inevitably, consultation -- is painfully obvious.

C. The Forest Plan Is A Continuing Agency Action That Requires Consultation

Even if there were some doubt about whether issuance of plan amendments triggers the ESA's consultation requirements, the Ninth Circuit has definitively resolved the matter. In *Pacific Resources Council v. Thomas*, 30 F.3d 1050 (9th Cir. 1994), the court concluded "there is little doubt that Congress intended to enact a broad definition of agency action in the ESA, and therefore that the [Land and Resource Management Plans] are continuing agency action." Certainly, if a forest plan requires consultation, then a significant amendment to a plan that will affect both a listed species and its habitat compels consultation. Rather than embarking on a path of certain litigation and a near-certain remand to the agency, with the attendant waste of both the Forest Service's and the conservation groups' time and resources, the Forest Service

species to the point where it can safely be removed from the list of threatened and endangered species. *Seattle Audubon Society v. Evans*, 952 F.2d 297, 301 (9th Cir. 1991). The Forest Service's proposed plan amendments are silent on these issues -- and fail to inform the public of how the agency will fulfill its mandate to improve the status of the spotted owl.

III. THE PROPOSED ACTION WILL NOT ASSURE THE VIABILITY OF THE NORTHERN GOSHAWK AND VIOLATES THE NATIONAL ENVIRONMENTAL POLICY ACT

A. Background

The plight of the Northern goshawk is well known and has been amply documented. In 1982, the Forest Service added the goshawk to its list of sensitive species, as a result of concerns that had been expressed by state wildlife management agencies and others about both the viability of goshawk populations and threats to their habitat. The Northern goshawk is found throughout the national forests of New Mexico and Arizona.

As concerns about habitat threats to goshawks grew, the Regional Forester convened a Goshawk Scientific Committee in March 1990, and assigned to it the task of devising a goshawk management strategy. However, this process was fundamentally flawed from its inception.

After the Scientific Committee's initial meeting, both the general public and the state wildlife management agencies were excluded from the committee's deliberations.[4] The parallel Goshawk Task Force did include representatives of state wildlife management agencies. However, the Task Force members have been unable to reach agreement on the scientific validity of the Scientific Committee's strategy, and some Task Force members have strongly expressed reservations about the Scientific Committee's conclusions and recommendations.

In June 1991, the Regional Forester issued interim guidelines for goshawk management. He did so over the objections of state wildlife management agencies, without providing the public an opportunity to comment on the guidelines prior to their issuance, and without even a perfunctory attempt at compliance with NEPA. A number of conservation organizations appealed the Regional Forester's decision. The Chief Forester denied the appeal but remanded those interim guidelines with directions that the Forest Service re-issue the guidelines and accept public comment.

In January 1992, the Scientific Committee released its final Management Recommendations for the Northern Goshawk (MRNG). After reviewing the MRNGs, the Task Force members were divided over the wisdom and efficacy of the MRNGs. The U.S. Fish and Wildlife Service and the AGFD formally expressed their agencies' reservations with the Forest Service. Nevertheless, the Regional Forester accepted the Scientific Committee's recommendations and used them as the basis for the second set of interim guidelines, again

[4]The Forest Service's decision to limit the Scientific Committee to Forest Service employees, and its subsequent refusal to address or respond to significant criticisms of the Scientific Committee's work from both professional wildlife biologists and state wildlife management agencies continues to undermine the Committee's and the Forest Service's credibility.

without benefit of NEPA compliance.[5] *See* 57 Fed. Reg. 27424 (June 19, 1992).

In December 1993, the Forest Service unilaterally re-issued the interim guidelines, and again promised to comply with NEPA in the future, Those guidelines will remain in effect until 1995. 58 Fed. Reg. 63910 (Dec. 3, 1993).

B. Legal requirements

One of the forces precipitating passage of the National Forest Management Act (NFMA) of 1976, 16 U.S.C. § 1600 *et seq.*, was a concern that the Forest Service had elevated timber harvests to a preferred use, to the marked disadvantage of fish and wildlife populations. Senator Jennings Randolph, one of the two principal Senate sponsors of NFMA legislation, frequently expressed such concerns, and would have gone so far as to preclude any timber removal that would have significantly affected fish and wildlife populations. Senator Humphrey, the other principal author of NFMA in the Senate, concurred with Senator Randolph's diagnosis, though not with his precise prescription for change. *See generally*, Wilkinson and Anderson, *Land and Resource Planning in the National Forests*, 64 Oregon Law Review 1, 273-311 (1985).

Ultimately, the Congress set a general direction for the Forest Service, with the intent of making water quality, wildlife, and other so-called forest amenities co-equal with timber production, *see Seattle Audubon Society v. Moseley*, 798 F. Supp. 1484, 1489 (W.D. Wash. 1992)(citing Wilkinson and Anderson approvingly), but deferred to the agency on the specifics. Accordingly, the agency's implementing regulations provide clear and precise direction. The agency's regulations provide that "fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired vertebrate species in the planning areas." 36 C.F.R. § 219.19. A viable population is "one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence in the planning area." *Id.*

In other words, "[t]o ensure viability, habitat must be provided to support at least a minimum number of reproductive individuals." *Seattle Audubon Society v. Evans*, 771 F. Supp. 1081 (W.D. Wash. 1991), *aff'd* 952 F.2d 297 (9th Cir. 1991). Since it would not be practical to manage the forest for every wildlife species, the Forest Service is authorized to select certain "indicator species," which the agency must monitor as surrogates for general wildlife viability. *Id.*; 36 C.F.R. §219.19(a)(1). As a sensitive species, the northern goshawk also qualifies as a management indicator species. So too does the Mexican spotted owl.

C. The Forest Service's Proposal Will Not Ensure the Continued Viability of the Northern Goshawk and also Violates NEPA

1. The proposal violates NEPA by failing to evaluate alternatives.

At no point in the history of the MRNGs, and the interim guidelines that the MRNG's begat, has the agency completed an adequate NEPA analysis. So far as we can determine, the proposed Forest Plan Amendment simply incorporates the MRNGs in their entirety as a

[5]At the same time, the Forest Service provided notice of its intent to prepare an environmental impact statement addressing the interim guidelines for the northern goshawk.

planning assumption. Yet nowhere, either here or at any other place, has the agency taken a hard look at the basis, purpose, and effectiveness of the MRNGs, or compared them to alternative conservation strategies. Instead, the agency treats the MRNGs as a given -- as an unquestioned assumption within the proposed Forest Plan Amendment.

Consequently, the Forest Service still has not explained the basis for the MRNGs, identified the risks and putative benefits of the MRNGs, identified and weighed alternatives that might provide a far greater margin of protection for the goshawk, spotted owl and other sensitive species, or compared those alternatives to the Forest Service's MRNGs. The public has never had an opportunity to comment upon the full range of issues implicated by the MRNGs or their claimed benefits to forest health, and the agency has never responded to the criticisms leveled not only by members of the public but also by wildlife management agencies and professional wildlife biologists.

A multitude of NEPA violations are evident in this Forest Plan Amendment process. Perhaps the most glaring error lies in the Forest Service's failure to identify, much less examine, alternative management strategies for goshawk management. "The alternatives

a strategy we both can support.

Letter from Regional Director, U.S. Fish and Wildlife Service to Regional Forester, August 13, 1992 (emphasis added).

The AGFD has listed a host of disagreements with the Forest Service's MRNGs, all of which have been ignored:

> "[T]he Department believes that application of the interim guidelines for the foraging area will result in forest conditions which do not adequately meet the needs of the goshawk and other wildlife species...." AGFD Review at 5;
>
> "The MRNG assumes that is beneficial to manage for open forest conditions in the goshawk foraging area.... The Department disagrees with the assumed need to provide open forest conditions throughout the foraging area." AGFD Review at 17;
>
> "The Department believes that by managing the foraging area to provide a more dense (i.e., with much of the canopy cover above 60%) mature forest, the Forest Service can maintain the mycorrhizal fungi community, high quality habitat for numerous prey and, more importantly, provide a forest structure where goshawks can effectively and successfully hunt." AGFD Review at 20;
>
> "The Department continues to be concerned that the low canopy cover (i.e., 40% or less) and low tree densities prescribed under the Implementation Guidelines will negatively affect wildlife habitat." AGFD Review at 24;
>
> "Forest managers have expressed interest in applying MRNG prescriptions to areas allocated as old growth and areas designated as 'unsuitable' for timber production....; and
>
> "Areas currently exempt from intensive timber management are important habitats for many wildlife species.... These areas have habitat characteristics that are rare outside of these protected areas (e.g., more snags, larger blocks of habitat, larger trees, critical transitional habitat from summer range to winter range). Old growth and 'unsuitable' acres make a valuable contribution to the variation in forest conditions which enhances wildlife diversity." AGFD Review at 31.

Another professional wildlife biologist who has extensively studied the northern goshawk concluded that goshawk nesting success "appears to be closely associated with dense overstories and open understories." He also determined that as a result of partial harvesting over an extensive area, goshawk "reoccupancy decreased by an estimated 97%," calling into serious question the Forest Service's MRNGs, which would sanction timber removal within areas occupied by goshawks. D. Coleman Crocker-Bedford, *Goshawk Reproduction and Forest Management*, 18 Wildlife Society Bulletin No. 3 (1990).

The breadth and scope of these criticisms (and those set out elsewhere in these

comments) leads ineluctably to the conclusion that the Forest Service's chosen management strategy will not ensure the viability of the Northern goshawk on the national forests of the Southwest. Conversely, the Forest Service's proposal will set in motion a timber management strategy that will significantly and deleteriously affect a species that is in decline throughout its range. Indeed, the Forest Service's proposals will only exacerbate the goshawk's plight. That is a substantive violation of the National Forest Management Act's directive to the Forest Service to protect the viability of management indicator species.

Beyond that substantive violation, the Forest Service's management strategy suffers from serious procedural errors. A similar situation existed a few years ago in the Pacific Northwest. The Forest Service convened a panel of scientists to develop a plan for conserving the northern spotted owl. That panel released a strategy for management of the northern spotted owl. The federal land managers then attempted to implement that proposed conservation strategy without having first evaluated it in an EIS. The courts found two fatal errors in that process.

First, since there had been no EIS, the proposal had "not been put to the test of public comment and hearings" where its adequacy could be assessed. *Seattle Audubon Society v. Evans*, 771 F. Supp. 1081, 1093 (W.D. Wash. 1991). An EIS that fairly evaluates the MRNGs

project and the difficulties involved in the alternatives.

Silva v. Lynn, 482 F.2d 1282, 1285 (1st Cir. 1973)(internal citations omitted).

It will not well serve the agency, the public, or the national forests of the Southwest if the Forest Service does not address the criticisms of reputable scientists. Neither will it serve any of us if the Service does not explain why it selected the MRNGs, how they compare to the alternatives, and what the risks of implementation might be. The Forest Service must, in short, explain its reasoning. *Seattle Audubon Society v. Espy*, 998 F.2d 699, 704 (9th Cir. 1993).

ADDITIONAL LEGAL AND OLD GROWTH ISSUES

I. THE FOREST SERVICE HAS FAILED TO FOLLOW NFMA PROCEDURES REGARDING AMENDMENTS TO THE REGIONAL GUIDE.

The Forest Service has proposed significant changes in each of the Forest Plans in region three without first proposing these changes in the form of an amendment to the regional guide. NFMA regulations set forth in 36 C.F.R ' 219.4 maintain that "planning requires a continuous flow of information and management direction among the three Forest Service administrative levels: national, regional, and forest," and that "regional planning is a principal process for conveying management direction from the national level to the forest level.." The Forest Service, in the proposed Forest Plan amendments, is attempting to bypass its regional planning level duties. As a result, significant changes in Forest Service policies at the national level, such as new emphasis on ecosystem management, have not been incorporated into this region-wide planning effort.

The regional guide is a document meant to provide consistency between a region's forest plans, especially in the treatment of significant regional issues. As such, the regional guide must address "[n]ew or significantly changed regional management standards and guidelines necessary to address major regional issues..." (36 C.F.R. ' 219.9 (a)4). In addition, regional guides are required to provide current guidance on silvicultural systems and the use of even-aged management, and guidance regarding the definitions of created openings. Since the proposed Forest Plan amendments address significant regional forest issues regarding the Mexican spotted owl, Northern goshawk, and old growth, and since significant changes in silvicultural systems are proposed, the Forest Service has a duty to amend the regional guide as authorized by 36 C.F.R. ' 210.7 (f).

The Forest Service, in the Pacific Northwest, followed proper NMFA procedures by amending the regional guide to incorporate standards and guidelines for management of habitat for late successional and old growth related species within the range of the Northern spotted owl. The Southwestern region proposes similar significant regionwide changes in Mexican spotted owl, goshawk, and old growth management and must recognize its duty to amend the regional guide prior to issuing amendments to each of the region's forest plans.

II. THE FOREST SERVICE HAS FAILED TO FOLLOW PROPER NEPA AND NFMA

in the absence of agency preference or prejudice. In this case, the Forest Service submitted a detailed "proposed action" at the scoping stage, and severely prejudiced the EIS process by failing to invite pubic participation in review of alternative conservation strategies for the Mexican spotted owl, the Northern goshawk, and old growth ecosystems.

The agency's preferred conservation strategies, including ID#2 and the MRNG were made known to the public from the start. In fact, the Forest Service has deliberately narrowed the scope of the proposed action avoid substantive debate on these management strategies at all. "The expressed purpose of this amendment is to incorporate management direction (for the Mexican spotted owl and northern goshawk) in current forest Plans." (DEIS at 40). By doing so, the Forest Service has excluded from consideration multiple- species, multiple territory conservation strategies such as that developed for Northwest forests, alternative goshawk strategies based on "Habitat Conservation Areas" such as those advocated for the Queen Charlotte goshawk by Cole Crocker-Bedford, or alternatives based upon the principles of conservation biology and landscape ecology.

By arbitrarily limiting the scope of the issues addressed by the DEIS and proposed Forest Plan amendments, the Forest Service is attempting to rush through its ecologically flawed

NFMA's requirement to "maintain viable populations of all existing native and desired non-native vertebrate species in the planning area . " (36 C.F.R. ' 219.19) and NFMA regulations regarding appropriate silvicultural systems found in 36 C.F.R. ' 219.27. The range of alternatives must be designed to present various strategies for meeting these statutory goals. However, by admission, the Forest Service's proposal is simply designed to present alternative formats for incorporation of pre-decided conservation strategies represented by the MRNG and ID#2.

As a result, all action alternatives use the MRNG and ID#2, all action alternatives result in approximately the same VSS distribution over time, and all action alternatives allocate roughly the same percentage of the landscape to old growth management (10-20%). Similarly, the Forest Service's proposal utilizes one table of pre-decided silvicultural definitions and descriptions to replace existing Forest Plan direction. An adequate range of alternatives must include alternative conservation strategies for the owl and goshawk, old growth retention acres far greater than the range proposed, and silvicultural guidelines that reflect true selective/ restoration forestry approaches. Only by including such alternatives can the Forest Service meet its NEPA duty to "present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice.." (40 C.F.R. ' 1502.14, emphasis added; see also California v. Block, 690 F 2d 753, 765-769 (9th Cir. 1982).

By constraining the range of alternatives as such, the Forest Service has conveniently avoided any serious debate on the merits of its owl and goshawk conservation plans or its proposed silvicultural practices, and has arbitrarily denied consideration of reasonable alternatives advocated by the scientific and conservation communities.

IV. THE DEIS FAILS TO ANALYZE THE EFFECTS OF THE PROPOSED ACTION ON OLD GROWTH ECOSYSTEMS

if maps were generated from the VSS data. As initially raised in comments submitted by the Arizona Game and Fish Department in May of 1993, the region's VSS 6 classification fails to distinguish between stands that have dense concentrations of large trees (18-24" DBH), and old growth forests with each of the structural components (AGFD at 22,23). Of the 11% VSS 6 depicted in Table 5 in the DEIS, then, only a fraction actually has sufficient structural diversity to qualify as old growth.

Secondly, the values of such forests must be determined, including the occupied and potential

BIOLOGICAL DIVERSITY

I. SINGLE SPECIES VS. ECOSYSTEM MANAGEMENT.

The DEIS is contrary to the direction of National Forest ecosystem planning. It is disheartening that while other regions are developing complex ecosystem management plans based on hundreds of species and habitat types (see Table 1), the Southwest is proposing to manage the vast majority of its forested landscape for two species. We suggest that in addition to the proposals below, the Forest review "What is Ecosystem Management?" (Grumbine 1994) and a Forest Service compilation entitled "Volume II: Ecosystem Management: Principles and Applications" (Jensen and Bourgeron, 1994). The former reviews 33 scientific articles on ecosystem management, drawing out and discussing 10 consistent themes and 5 goals. The latter provides land managers with practical suggestions for implementing ecosystem management.

TABLE 1. ECOSYSTEM MANAGEMENT PROPOSALS FOR NATIONAL FOREST SYSTEM LANDS

AREA	PROPOSAL
Southeast Alaska	A Proposed Strategy for Maintaining Well-Distributed, Viable Populations of Wildlife Associated with Old-Growth Forests in Southeast Alaska. The Interagency Viable Population Committee for Tongass Land Management Planning. USDA Forest Service. 1994.
Pacific Northwest	Final Supplemental Environmental Impact Statement on Management of Habitat for Late Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl. Volumes I and II. USDA Forest Service and USDI Bureau of Land Management. February, 1994.
Northwest Eastside Forests	Interim Protection for Late-Successional Forests, Fisheries, and Watersheds: National Forests East of the Cascade Crest, Oregon, and Washington Eastside Forests Scientific Society Panel. August, 1994
Columbia River Basin	PACFISH: A Strategy for Restoring and Protecting Habitat for Anadromouns Fisheries in Watershed in Federal Ownership in Oregon, Washington, Idaho and California Outside the Range of the Northern Spotted Owl. USDA Forest Service, March, 1994.
Greater North Cascades Ecosystem	Cascadia Wild: Protecting an International Ecosystem. Greater Ecosystem Alliance. Bellingham, WA. 1993.
Greater Yellowstone Ecosystem	Sustaining Greater Yellowstone, A Blueprint for the Future. Greater Yellowstone Coalition. Bozeman, MT. 1994.
Great Lakes Ecosystem	The Conservation of Biological Diversity in the Great Lakes Ecosystem: Issues and Opportunities. The Nature Conservancy: Chicago, IL. 1994.
Sierra Nevada	Sierra Nevada Ecosystem Project: Progress Report Sierra Nevada Ecosystem Project Science Team, University of California, Davis, May, 1994

II. NORTHERN GOSHAWK

A. ALTERNATIVES C & F ARE INACCURATELY DESCRIBED AS IMPLEMENTING THE MRNG.

Goshawk direction in alternatives C & F is described as following "that which is presented in the report *Management Recommendations for the Northern Goshawk in the Southwestern U.S.*, (RM-217)" (p. 7). In fact, both alternatives depart significantly from the MRNG. The MRNG calls for 20% of the landscape to be in each of VSS 4, 5, and 6. Alternatives C & F, however, reduce VSS 6 to 15% and increase VSS 4 to 25%. The DEIS does not even attempt to justify this departure. What biological justification can there be for reducing the percentage of the highest volume, rarest, most valuable habitat type? This misrepresentation will result in higher harvest volumes and lower habitat quality.

B. THE VIABILITY ANALYSIS IS INADEQUATE.

These is essentially no viability analysis. The first paragraph of the goshawk section states that the contents of the analysis are mostly "a direct synopsis" of the MRNG. The purpose of the DEIS, however, is not to recount the MRNG, it is to analyze the adequacy of the MRNG. It does not do this. All it does is recount some basic information about goshawk biology and changes in historic forest conditions. Without connection to the previous discussion, the DEIS suddenly concludes: "Use of the Committee's management recommendations is not expected to diminish the population viability of the northern goshawk." There is absolutely no reasoning presented which could lead to this "conclusion." Adding to the absurdity, this central conclusion of the entire DEIS is referenced to a personal communication with Sandy

This erroneous interpretation of the MRNG leads to the dismissal of the widely held tenant that large blocks of old-growth function better than smaller blocks because they provide greater levels of interiority. These studies, the DEIS (p 44) claims, are based on areas outside the Southwest where there is a concern that forest interior species can not compete with edge adapted species.

> "However, it has clearly been demonstrated that this is no longer a concern for the goshawk and we know of no literature that shows this to be a concern for any of the species found in the Southwest."

Not only is goshawk not dependent upon extensive old growth forests or adversely affected by high interior-to-edge ratios, the DEIS claims it is actually dependent upon interspersion (p. 44). The Forest's "Interpretation and Implementation" document summarizes the sweeping conceptual change it perceives has been brought about by the MRNG:

> "There are several terms which now have less meaning or require less concern now with the goshawk recommendations than they did in even-age management with shorter rotations because of the inherent characteristics of ecosystem management. These are stand (site) adjacency requirements, cover, interior dwelling species, old growth, migration corridors, snag recruitment, wildlife trees, visual quality of objectives, and stand characteristics that were averaged over the stand."

In the brave new world of ecosystem management there will be no interior forest. Vegetative

Goshawk literature is relatively consistent in strongly associating goshawks in the United States with extensive forests or large stands of mature and old-growth trees:

Bartelt 1977, Bent 1937, Bloom *et al.* 1985, Crocker-Bedford 1987, 1990a, 1990b, 1991, 1992; Crocker-Bedford and Chaney 1988, Falk 1990, Fowler 1988, Hall 1984, Hayward and Escano 1989, Herron *et al.* 1985, Hennessy 1978, Jones 1981, Kennedy 1988, 1989; , Mannan and Meslow 1984, Moore and Henny 1983, Patla 1990, 1991; Patla and Trost 1993, Reynolds 1983, 1989; Reynolds *et al.* 1982, 1993; Saunders 1982, Shuster 1980, Siders and Kennedy 1993, Smith and Mannan 1993, Speiser and Bosakowski 1987, Ward *et al.* 1992, Warren *et al.* 1990, Woodbridge 1988, Zinn and Tibbitts 1990.

These forests provide ample perches, hiding cover, prey, protected nests sites, sparse understories, and well spaced tree trunks.

Goshawk Nesting Habitat is Generally Mature and Extensive. "Preferred habitat during the breeding season is older, tall forests---deciduous, coniferous and mixed---where goshawks can maneuver in and below the canopy while foraging and where they can find large trees in which to nest" (Reynolds 1989). Crocker-Bedford and Chaney (1988) similarly found a nesting preference for large trees with dense canopies on the Kaibab National Forest. Goshawks in Connecticut show a significant preference for nest sites far from forest clearings (average distance to clearing = 6 miles) -- farther than any other hawks (Falk 1990). In Germany, goshawks typically nest farther from openings than do other hawks (Kostrzewa 1987 and Gemauf 1988, as cited by Falk 1990). Extent of forest was also found to be important in New York (Speiser and Bosakowski 1987). In Pennsylvania, goshawks selected heavily forested landscapes (Kimmel and Yuhner 1993).

In contrast, goshawk nests in northern Idaho and Montana were found to average only .3 miles from forest openings larger than 3 acres (Hayward and Escano 1989). The authors noted, however, that their results were probably skewed by the fact that many of the nests were found during logging operations. Even so, the .3 mile buffer far exceeds the close spatial arrangements of high canopied VSS classes, low canopied VSS classes and opening in the preferred alternative identified by the DEIS. Goshawks have been known to successfully nest in a shrub-steppe ecosystem with only 10% tree cover by riparian aspen (Younk and

dominated by younger, thinned stands. A separate analysis of 53 territories on the North Kaibab Ranger District revealed an inverse correlation between productivity and amount of timber harvest (see Table 2). When some of the unlogged control plots for this study were later logged, only 40% remained active (Boyce *et al.* unpublished manuscript). By contrast 89% of the control territories which remained unlogged were active.

Subadult goshawks and Cooper's hawks are sometimes displaced into non-traditional or marginal nesting habitats (McGowan 1975, Moore and Henny 1984). A pair of goshawks was reported nesting in a riparian willow and poplar stand surrounded by tundra, for example, but produced only 1 young and nested only once in 12 years (Swem and Adams 1992).

TABLE 2. GOSHAWK PRODUCTIVITY IN RELATION TO TIMBER HARVEST ACTIVITY ON THE NORTH KAIBAB RANGER DISTRICT, ARIZONA (CROCKER-BEDFORD 1991).

Number of Territories	Percent of Territory Harvested	Number of Nestlings
14	0	1.57
12	10-39	0.75
16	40-69	0.31
11	70-90	0.00

Reoccupancy Rates are Higher in Extensive Mature Forests. Reynolds and Wight (1978) found nest reocuppancy in Klamath County, Oregon to be 43% at two years, 41% at three years, 29% at four years and 25% at five years. Crocker-Bedford and Chaney (1988) found on the Kaibab National Forest, that in the year nests were first located, 45% were occupied (a greater percentage due to occupied nests being easier to find); whereas 1, 2, and 3 years after, nest location occupancy rates were 32, 28, and 26%. Also on the Kaibab National Forest, Crocker-Bedford (1990) found that in the absence of habitat alteration, reoccupancy a decade after nest location was just as likely as reoccupancy 1 to 6 years after location. Woodbridge (1988) found high turnover, but more consistent reoccupancy rates in larger stands of trees. Patla (1991) found 51% reoccupancy of nests in undisturbed/preharvest locales but only 10% reoccupancy in harvested locales.

Reoccupancy of territories is higher since occupied territories contain several alternate nests, but only one active nest. Territory reoccupancy is therefore probably a better measure of habitat usage than nest reoccupancy. Crocker-Bedford (1991) found territory reoccupancy on the Kaibab National Forest to be inversely correlated with harvest levels (see Table 3). When his unlogged control territories were later logged, they too became unoccupied (Boyce *et al.* unpublished manuscript).

TABLE 3. GOSHAWK TERRITORY REOCCUPANCY IN RELATION TO TIMBER HARVEST ACTIVITY ON THE NORTH KAIBAB RANGER DISTRICT, ARIZONA (CROCKER-BEDFORD 1991).

Percentage of Home Range Selectively Harvested	Mean Reoccupancy Rate
0	79
25	42
50	31
75	9

Using aerial photography, Ward *et al.* (1992) correlated reocuppancy on the Kaibab National Forest with canopy closure. Territories active 1986-1989 were more likely to be occupied in 1991 if they were not harvested or only lightly harvested. Reoccupied territories had less forest in the 20-40% canopy closure range and more forest in the 40-60% closure range than did unoccupied territories.

Home Ranges are Smaller and Overlap is Greater in More Extensive Forests. Northern goshawks defend a 20-25 acre area around active nests against human intrusion (Reynolds 1983), and a larger area surrounding alternate nests against other raptors. The territory defended against conspecifics may be larger than that defended against humans (Crocker-Bedford 1992). All of 34 territories found on the Targhee National Forest were

TABLE 4. DENSITIES OF PAIRS OF BREEDING GOSHAWKS IN CONIFEROUS

Crocker-Bedford (1990a) summarizes adverse effects of logging on goshawks:

> "Goshawk breeding density varies with the volume of forest canopy (for prey production), tree size (for prey production, nesting sites, perches, and the goshawk's ability to fly beneath canopy and between tree trunks), openness beneath canopy (to facilitate goshawk flight and reduce prey escape cover), and continuity of forest (to maintain prime foraging habitat and to reduce competition and predation on goshawks by open-forest raptors). Logging's depressing effect on goshawk density probably

goshawk to prefer forest tracts larger than 100 acres by a factor of ten over 50 acre patches Austin (1993) found 10 radio-tagged goshawks to avoid openings and select forest tracts with greater than 40% canopy cover.

Contrary to these findings is a study which found goshawk nests in northern Idaho and Montana to average only .25 miles from forest openings larger than 3 acres (Hayward and Escano 1989). The authors noted, however, that their results were probably skewed by the fact that many of the nests were found during logging operations.

Intra/Inter-specific Competition for Nest Sites and Prey Items is Increased by Forest Fragmentation. Modification of old-growth habitat which reduces canopy cover and/or decreases interior-to-edge ratios, may give a competitive advantage to other raptors which thrive in these situations. Excessive competition may reduce chances of successful hunting and nesting. This general assessment is supported by numerous studies and observations.

Bendire (1892) suggested that goshawks drive all other raptors off their hunting territories and usually nest a "considerable distance" from red-tailed hawks. He also cites competition between goshawks and great horned owls. Crocker-Bedford (1990b) similarly found that in unlogged control plots on the Kaibab National Forest, that nests of other raptors were no closer than 0.6 miles from goshawk nests. After logging, however, most goshawk territories were usurped by raptors better adapted to forest edges and open canopies.

Red-tailed hawks, Long-eared owls, Great horned owls, and Great gray owls are better adapted to hunting in sparse forests and forest openings. Numerous researchers have commented that they benefit from logging operations (Franzreb and Ohmart 1977, Moore and Henny 1983, McCarthy *et al.* 1989). Patla (1991) found four former goshawk nests in a highly modified forest were occupied by Great gray owls. Mikkola (1983 in Patla 1991) reports 56.6% of Great gray owl nests in Finland to be in former goshawk nests. Bull *et al.* (1988) found 50% of all Great gray owl nests in a logged locale in Oregon to be in former goshawk nests. Bryan and Forsmann (1987) found 6 of 11 central Oregon Great gray owl nests to be in abandoned goshawk nests. Mikkola has noted that the two species are highly competitive and that Great grays often take over occupied goshawk nests. Goshawk presence in northern Europe despite significant forest fragmentation has been attributed to lack of a European counter-part to the red-tailed hawk (Beebe 1984).

Predation on Goshawks May be Increased by Forest Fragmentation. Logging increases the likelihood of predation on goshawks by introducing open areas near goshawk nests and PFAs, and by forcing goshawks to pass through open areas which hunting or dispersing (Crocker-Bedford 1992). Nestlings and juveniles are most likely to be taken, though adult goshawks may be taken as well.

4. SECOND ASSUMPTION: GOSHAWKS ARE DEPENDENT UPON PREY ABUNDANCE NOT AVAILABILITY, AND THEREFORE DO NOT DIRECTLY SELECT FOR FOREST STRUCTURE. The MRNG and the DEIS are strongly oriented around this assumption. It leads to the management conclusion that maximizing prey abundance (and diversity) will most effectively maintain high goshawk densities. This in turn leads to the

recommendation that interspersion be maximized.

The MRNG cites numerous studies showing that raptor populations are limited by prey abundance, prey availability and nest site availability (pp. 5-6). Prey abundance primarily concerns habitats which produce large numbers/diversity of prey species and assumes goshawks will forage wherever prey are found. Prey availability, on the other hand, concerns habitats which allow goshawks to successfully hunt prey and assumes that goshawks prefer to forage in certain kinds of forests. The MRNG ultimately concludes that protecting nest sites and insuring abundant prey are the most important goshawk conservation issues.

The MRNG cites no studies bearing on the issue of whether or not goshawks are limited by foraging habitat structure and/or composition. It states that "little is known about the structure and composition of habitats used by foraging goshawks," but goes on to conclude that goshawks are opportunistic feeders and will hunt in many forest types and conditions. Six references are cited to support this position- three published articles, one set of unpublished data, and two personal observations. Based on these, the MRNG concludes that goshawks are more closely tied to prey availability than to habitat structure or composition *per se*. The issue of prey vulnerability and preference for certain types of foraging habitat is dropped from further consideration.

We can not comment on the unpublished data or the personal observations. We do question, however, the MRNG's use of the three published articles and its failure to reference studies which demonstrate selection for certain foraging habitat compositions and structures, and a correlation between territory re-occupancy rates and condition of foraging habitat.

The Three Studies Cited Do Not Justify the Conclusions of the MRNG. It is true that goshawks use a variety of forest types as foraging areas. It does not follow, however, that they are forest generalists. Within these different forest *types*, they consistently select for a certain *structure*. Goshawks are forest specialists with a strong and demonstrated preference for mature forests. These forests support abundant prey species *and* contain the attributes necessary for successful hunting.

On of the articles (Kenward and Widen 1989) conveys the results of a single field study in Sweden. It found that goshawks in three highly manipulated farmland/woodland areas foraged primarily along woodland edges, while goshawks in a heavily forested area avoided edges and primarily foraged in the forest interior. In both cases, goshawks appeared to select areas with the most abundant prey rather than any particular kind of habitat. This correlation is affirmed by the fact than in the one farmland/woodland site in which pheasants were purposefully released, goshawk diets were 96% pheasant.

Great care must be taken in applying the results of this study to the Kaibab National Forest or to less altered landscapes. Because of the climactic difference between central Sweden and the American Southwest, goshawk habitat requirements may well be very different. The highly fragmented woodlands may not have produced enough prey or contained the habitat components necessary for successful hunting. These goshawks may well have been forced to forage in the best available habitat (farmland/woodland interface) which was nonetheless marginal habitat. Habitat correlations derived from such a highly altered

landscape do not necessarily reveal much about preferred habitats in relatively natural landscapes. The heavily forested site is more similar to conditions on the Kaibab. In this area, goshawks displayed a preference for extensive, mature forests and avoided edges.

The second study (Widen 1989), also from Sweden, found that goshawks preferred to forage in mature, tall forests with relatively open understories even though adjacent younger forests contained more prey. It concluded that goshawks were selecting for forest structures in which prey were vulnerable, not for forests in which prey were plentiful. The birds showed no preference in size for clearcuts, young forests, or middle-aged forests, but did select for larger stands of mature forest. Mature stands larger than 100 acres were used ten times more frequently than mature stands less than 50 acres. Most successful foraging attempts were in mature forests.

The third article (Fischer 1986) is a Ph.D. Dissertation. It conveys the results of a radio-telemetry study of 18 sharp shinned hawks, 9 Cooper's hawks and 2 goshawks in the Uinta National Forest, northeast of Provo, Utah. Its conclusions were very similar to Widen (1989). Fischer found that the goshawks foraged in several habitat *types* but showed a preference for tall, mature and old-growth forest structures. In second manuscript written the same year (Fischer and Murphy 1986), the authors concluded that the radio-tagged accipiters selected densest foraging available in which their respective body sizes would allow them to maneuver. The two goshawks avoided the habitat with the highest prey density and selected for taller, larger diameter trees with deeper canopy closures and lower prey densities. Citing additional unpublished data (Fischer) and two other studies (Lee 1980, 1981), the authors concluded that goshawks, and accipiters in general, may not be food-limited.

Studies Not Cited by the MRNG Suggest Goshawks Require Mature Forest Structures for Foraging. The MRNG does not refer to, or analyze, data which suggests that goshawks may directly require certain forest structures. It simply cites one study which implies goshawks are prey availability dependent, and selectively cites portions of two other studies which show goshawks forage in several habitat types. From this it concludes that goshawks are dependent upon prey abundance and only secondarily on forest structure. Scientific studies completed before and after the MRNG was published, however, suggest that forest structure is important to goshawks.

In addition to Fischer (1986), Fischer and Murphy (1986), and Widen (1989), radio telemetry studies in California (Austin 1991, Austin 1993, Hargis *et al.* 1993) found goshawks selecting tall, mature and overmature trees as foraging substrates. Studies by Crocker-Bedford (1990a, 1990b, 1991), Crocker-Bedford and Chaney (1988), Ward *et al.* (1992), found goshawks on the Kaibab National Forest select foraging areas which have high canopy closures and mature trees. They also vacated territories which were logged at some distance for the nest stand suggesting that they avoid potential foraging areas in which the overstory canopy has been reduced by logging. Bright-Smith and Mannan (in press), Mannan and Smith (1993), and Drennan (1994 and pers. comm.) radio-tagged birds on Kaibab National Forest. Drennan found that goshawk did not select foraging sites based on prey abundance. Bright-Smith and Mannan found the mean rank of relative preference of 11 goshawks increased with increasing canopy closure. On an individual level, 3 of the birds used areas with canopy closure >55% more than expected, 1 used areas with canopy closure 34-55%

less than expected, 4 used areas with canopy closure <34% less than expected, 3 used areas with canopy closure<15% less than expected, 2 used areas >200 meters from an edge more than expected, 1 used areas between 100-200 meters from an edge more than expected, 1 used areas 50-100 meters from an edge less than expected, and 1 used areas with high dispersion less than expected. 10 birds showed no significant relation to high dispersion areas.

Field Tests of the MRNG Contradict its Assumptions

Joseph Drennan and Dr. Paul Beier of Northern Arizona University have conducted the only study to date which directly tests the basic assumptions of the MRNG. Their research showed that radio-tagged goshawks on the Coconino National Forest 1) did not select to forage in areas with the greatest prey abundance, and 2) did forage in areas with taller trees, larger trees, more closed canopies, and greater tree densities than random sites. These results experimentally confirm the critiques of the MRNG put forth by the U.S. Fish and Wildlife Service, Arizona Game and Fish and New Mexico Fish and Game. All three wildlife agencies have advised the Forest Service that the scientific evidence indicates that the goshawk is primarily dependent upon forest structure not prey abundance, and that management emphasis should focus upon retaining large, tall trees, relatively dense forests, and high canopy closures.

This information is particularly important since the Scientific Committee, while assuming the crucial importance of prey abundance, never explicitly argued against, or presented data to contradict the importance of forest structure.

III. MEXICAN SPOTTED OWL

A. THE DEIS FAILS TO DISCLOSE THE FOREST SERVICE'S ACTUAL INTENTIONS REGARDING THE INCORPORATION OF A MEXICAN SPOTTED OWL CONSERVATION STRATEGY INTO THE VARIOUS FOREST PLANS

receiving public comment or even mailing out the DEIS

B. THE DEIS FAILS TO CONSIDER THE CUMULATIVE EFFECTS OF LOGGING ON NATIVE AMERICAN NATIONS.

The DEIS does not address MSO habitat loss and landscape level fragmentation associated with logging on Native American Nations. Substantial owl habitat and timber programs exist on the White Mountain Apache, Navajo, Mescalero and other nations. The combined effect of habitat modification on National Forest and Native American lands has, and will continue to greatly influence the forest landscape The White Mountain Apache Nation, abutting the Apache-Sitgreaves National Forest is particularly important. It has more old growth forest and MSO habitat than all other Indian Nations combined. It also has the largest Native American timber program. Its proximity to rare and extensive tracts of mature forest on the Alpine and Springerville Ranger Districts makes it a key MSO habitat area. The heavily logged Mescalero Nation abuts the heavily logged Lincoln National Forest which is also key MSO area. The Chuska Mountains on the Navajo Nation form a heavily logged sky island that may be a critical stepping stone linking very small, extinction prone northern MSO populations to larger southern populations.

C. THE DEIS FAILS TO CONSIDER THE CUMULATIVE EFFECTS OF CATTLE GRAZING.

The effects of grazing on forest structure and fire suppression are well known (see goshawk section). Grazing has also been identified as a threat to the MSO's prey base and to its riparian habitat by the U.S. Fish and Wildlife and researchers such as Dr. Peter Stacey. Grazing is a past, ongoing and planned management activity which combines with other management activities such as logging to influence the habitat value of the landscape.

D. THE KAIBAB NATIONAL FOREST IS AN IMPORTANT MSO FOREST AND SHOULD HAVE BEEN INCLUDED IN THIS DEIS.

The absence of the Kaibab National Forest from this DEIS, and the failure of the Kaibab DEIS to adequately analyze effects on the MSO is a serious flaw in both documents. There have been at least 20 MSO responses and sightings (some of juveniles) on the Kaibab National Forest (Spiller 1994). The Kaibab National Forest is the only link between the Mogollon Plateau MSO populations and the tiny population in southern Utah. Small, isolated populations are very prone to local extinction. Such populations are dependent upon continual re-colonization from connected, larger populations. The loss of the Kaibab National Forest as suitable nesting and dispersal habitat would greatly increase the likelihood that populations in southern Utah and northwest Arizona will go extinct with no possibility of recolonization. These kinds of concerns can only be addressed by a regionwide EIS which includes every Forest.

E. THE "ADAPTIVE ECOSYSTEM APPROACH" PROPOSED IN ALTERNATIVE F IS INAPPROPRIATE.

If one considers MSO populations sizes, MSO densities, amount of MSO habitat, and immediacy of threats, the Lincoln/Mescalero and Greater Gila Ecosystem (Gila/White

Mountains complex) are two of the most demographically critical MSO populations. Extra caution should rule the management of these populations. Alternative F, however, would establish an experimental logging system on the Apache National Forest right in the middle of the Greater Gila Ecosystem.

It is not clear why this alternative is described as an "adaptive ecosystem approach." The mere delineation of the landscape into 6 management zones based on slope and aspect does not an ecosystem make. Ecosystems include complex biological interactions, watersheds and hundreds of species. The FEIS should explain why this area is being considered an "ecosystem" and why this very simplistic logging system is considered "ecosystem management." What exactly is "adaptive" about it? What is the Forest Service testing and what methods will it employ to ensure scientifically credible results

[redacted]

This lack of reasoned analysis is especially disturbing since the U.S. Fish & Wildlife Service recently listed the MSO as a threatened species under the Endangered Species Act. One the main reasons given for listing the owl was the inadequacy of the Forest Service interim guidelines, the very guidelines the DEIS breezes over and concludes are perfectly adequate.

The DEIS's conclusion that ID No. 2 *in combination with* guidance derived from Fish & Wildlife Service biological opinions provides for viable populations violates the National Forest Management Act. The Forest Service is required to develop its own plan to maintain viable populations. It can not count on the Fish & Wildlife Service to continually intervene and tell it what to do. This exact issue has already been resolved by litigation over the Northern spotted owl.

G. THE DEIS FAILS TO USE THE BEST AVAILABLE SCIENTIFIC AND COMMERCIAL INFORMATION.

The DEIS states that "The desired condition is for all Forest plans to be up-to-date with the latest information on habitat needs for the two species...and be consistent with the latest information on habitat needs for the two species." The DEIS, however, contains virtually no references to the voluminous spotted owl and Mexican spotted owl scientific and management literature. It simply does not discuss or attempt to incorporate the latest information on MSO habitat. Furthermore, it is not consistent with latest information.

The Forest Service is still implementing the same habitat island conservation strategy which resulted in the MSO being listed as threatened. This particular strategy has been roundly discredited by extensive Fish & Wildlife Service critiques found in the proposal to list, final listing package and status review. This general raptor strategy has been extensively criticized (see Thomas et al. 1990). The history of Forest Service MSO conservation strategies shows an unwillingness to use the best available science or make significant changes to a markedly flawed plan.

1. A brief history of Mexican spotted owl management.

The MSO was listed as a sensitive species in 1983, the MSO Task Force was formed in 1988, and in 1989, the first interim directive ordering direct conservation measures was established. Interim Directive No. 1 was controversial. The core and territory acreages, based on an average of radio-tagged pairs, were too small. The even smaller core on the Lincoln National Forest was even more dangerously inappropriate. Roger Skaggs, MSO biologist and member of the Task Force summed up many of our concerns in his 8/27/89 letter to the Regional Forester He warned that:

- By using averages, "as many as 50% of our known Spotted Owl sites are risk," perhaps more, since two-thirds of the radio-tracked pairs had territories larger than the 2,000 acre average.
- Failure to protect the full foraging area could increase foraging area sizes, hence competition between adjacent pairs, and ultimately lead to reduced occupancy.
- By failing to protect unoccupied habitat, "in just one or two harvest cycles we may

create numerous small core-habitat islands that fix population size and distribution for the foreseeable future.
- Without guidance or accountability as to drawing of cores and management territories, District level discretion could allow harvest and road construction to take place too close to nests and roosts.

Mr. Skaggs began his letter with warning that the Management Direction section was "most deficient in providing for the maintenance of viable Spotted Owl populations," and concluded with 5 management recommendations and a plea to change the guidelines. The Regional Forester did not implement his recommendations and in December of 1989, Dr. Robin Silver filed a petition to list the MSO as endangered due to excessive timber harvesting and inadequate conservation guidelines. To this day, the vast majority of Mr. Skaggs' concerns have not been addressed.

management. Even though the Fish and Wildlife Service has deemed ID No. 2 inadequate and cited it as a major reason for listing the owl as threatened, the Southwest Region continues to implement ID No. 2. Worse yet, the Region is now planning to codify this biologically indefensible document into every Forest Plan by way of the preferred alternative in the current Kaibab and Region-wide E.I.S. processes. An E.I.S. should be done on a more credible landscape approach. We are dismayed and disturbed that the Region is continuing this irresponsible, entrenched trajectory. We are very much afraid the Region will continue to require the external force of law in order to change in a biologically significant manner.

2. Recent owl research.

Recent studies by Ganey and Balda (*Habitat selection by Mexican spotted owls in northern Arizona.* The Auk 111(1):162-169, 1994) and Peter Stacey (pers. comm.), affirm our previous concerns and highlight the need for a major change of direction in owl management. Ganey and Balda analyzed habitat use by eight radio-tagged owls on the Coconino and Apache National Forests. They determined:

- most roosting sites were in "virgin" mixed-conifer with a smaller number in "virgin" ponderosa pine
- most foraging sites were in "virgin" mixed-conifer and ponderosa pine habitats
- roosting and foraging sites had more big logs, higher canopy closure, and greater densities and basal areas of both trees and snags than random
- roosting sites had more big logs, higher canopy closure, and greater densities of both trees and snags than foraging sites
- more than one type of habitat was used on 157 of 208 nights (75.5%)
- there was a "striking pattern" of avoidance of managed forests

Of particular concern is the avoidance of managed forests, since 75% of the home ranges had been logged on at least 50% of the acreage (see Figure 1.). Logging has made the majority of home range habitat, for the majority of owls, less suitable for nesting, roosting or foraging. The vast majority of this logging was in ponderosa pine habitats. Unlogged ponderosa pine, by contrast, was used significantly. The current guidelines offer very little protection for ponderosa pine, it is often not even considered suitable habitat.

Four of the six birds with managed mixed-conifer in their home range did not roost in it at all. Five of the eight birds did not roost at all in managed ponderosa pine. Foraging use of managed forests was also very low. Foraging use of managed mixed-conifer was significantly low in five of the six home ranges with that habitat type. Foraging use of managed ponderosa pine was significantly low in six of the eight home-ranges.

	% OLD GROWTH				% MANAGED FOREST		
Owl (Sex)	Mixed-Conifer	Ponderosa	Pine-Oak	TOTAL	Mixed-Conifer	Ponderosa	Total
Walnut Canyon (M)	17	6	11	34.00	0	65	65.00
Walnut Canyon (F)	17	6	13	36.00	0	62	62.00
Schultz Creek (M)	55	13	6	74.00	4	15	19.00
Schultz Creek (F)	53	13	7	73.00	5	14	19.00
Weatherford Canyon (M)	20	14	0	34.00	7	58	65.00
Weatherford Canyon (F)	32	12	0	44.00	4	50	54.00
Snake Creek (M)	25	9	0	34.00	13	53	66.00
Conklin Creek (M)	34	15	0	49.00	35	15	50.00

The logging which made these stands unsuitable was not old time, heavy handed even age management. According to Ganey and Balda, "the managed stands on our study areas typically were uneven-aged stands resulting from partial overstory harvests." This indicates that use of even partial removals under uneven age prescriptions away from nest stands in foraging areas can compromise habitat capability for the Mexican spotted owl.

Recent research by Peter Stacey, professor of Ecology, Evolution and Conservation Biology at the University or Nevada at Reno, raises further questions about the adequacy of the current and proposed guidelines. Dr. Stacey has documented extensive use of mid-elevation riparian areas as nurseries and juvenile dispersal corridors. These habitats are not even considered by the guidelines, nevermind protected. Dr. Stacey's research should come as no surprise. Historic use of mid and low elevation riparian areas by MSOs is well documented, especially in southwest New Mexico and southeast Arizona. Riparian habitats are almost certainly the most degraded wide-spread habitat type on Southwestern National Forests. Overgrazing has seriously retarded broadleaf regeneration and succession, and is principly responsible for un-naturally severe and frequent flooding associated with lack of ground cover. Un-natural flooding has damaged stream morphology, further exacerbating long-tern riparian degradation. This politically sensitive habitat correlation was ignored by ID No. 1 and 2, and we are afraid will continue to be ignored, until the Forest Service is forced to consider it by external forces.

H. CONCLUSION.

The history of Forest Service efforts to conserve the Mexican spotted owl has been disappointing. Ignoring scientific warnings and data has been the norm. We do not hold you responsible for this Mr. Cartwright, however, as the new Regional Forester, you are inheriting an unfortunate momentum, and only by understanding that momentum, will you be able to change it. The current guidelines lack credibility and ignore scientific data. They are one of the stated reasons the U.S. Fish and Wildlife Service listed the Mexican spotted owl as

bird surveys conducted yearly since 1968, for example, revealed that 75% of all bird species appearing often enough to be significant along 5 transects in managed ponderosa pine forests in New Mexico are declining (Miller 1992). About one quarter of all species associated with ponderosa pine forests are declining (Diem and Zeveloff 1980, Hoover and Wills 1984).

Logging, grazing and fire suppression are responsible for the conversion of the Southwest's ponderosa pine forests. The removal of mature trees and snags has reduced structural complexity, creating a landscape of even-aged, even-spaced, immature trees. We may never understand the full ecological ramifications of this massive alteration of such a critical ecosystem. At least 71 bird species, 7 reptiles and amphibians, 10 mammals and 14 plant species associated with ponderosa pine forests in the Southwest are imperiled by past and present management practices (see Table 6). Declines of this magnitude are indicative of impaired ecosystem integrity; they may result in the disruption of seed dispersal patterns, increased insect infestation, increased disease, and other factors leading to general forest instability.

Counting only those species which appeared often enough and across enough transects to mitigate census errors and random fluctuations, Miller (1992) determined that eight bird guilds:

Woodland nesting	Open-cup passerines
Coniferous forest nesting	Short distance migrants
Primary cavity nesting	Permanent residents
Secondary cavity nesting	Neotropical migrants.

in New Mexico's managed ponderosa pine forests have declined since 1968.

Two guilds were particularly decimated: 100% percent of all coniferous forest nesting and neotropical migrant species have declined significantly since 1968. Similar analyses for Arizona were not possible because the data set was not large or diverse enough to exclude observer impacts or random fluctuations. Arizona's forests, however, have been managed under the same regime as New Mexico's while being more heavily logged. It is reasonable to believe birds there are equally imperiled. The combined New Mexico-Arizona data set revealed that a significant portion of all bird species recorded are declining, and that three guilds suffered significant declines: open-cup passerines, permanent residents and neotropical migrants.

TABLE 6. DECLINING SPECIES ASSOCIATED WITH SOUTHWESTERN PONDEROSA PINE FORESTS (Galvin 1993).

Reptiles and Amphibians:

Arizona ridged nose rattlesnake
New Mexico ridge nose rattlesnake
Sonoran mountain kingsnake
Bunchgrass lizard
Mountain skink
Green rat snake
Narrowheaded gartersnake

Birds:

Northern goshawk
Cooper's hawk
Sharp-shinned hawk
American peregrine falcon
Northern bald eagle
Flammulated owl
Mexican spotted owl
Northern pygmy owl
Common nighthawk
Downy woodpecker
Yellow-bellied sapsucker
Brown creeper
Pygmy nuthatch
Red-breasted nuthatch
White breasted nuthatch
Plain titmouse
Mountain chickadee
Common bushtit
Ruby crowned kinglet
Pinyon jay
Bandtailed pigeon
Mourning dove
Wild turkey
Red-winged blackbird
Western kingbird
Buff-breasted flycatcher
Ash-throated flycatcher
Gray flycatcher
Western wood peewee
Say's phoebe
Northern mockingbird
Hermit thrush
Loggerhead shrike
Cliff swallow
Grace's warbler
Black-throated gray warbler
Virginia's warbler
Yellow-rumped warbler
Yellow-eyed junco
Pine siskin
Eastern meadowlark
Western meadowlark
Brewer's blackbird
Mallard
Lark sparrow
Chipping sparrow
House sparrow
Elegant trogon
Hairy woodpecker
Acorn woodpecker
Violet-green swallow
Solitary vireo
Ladder-backed woodpecker
Warbling vireo
Mountain bluebird
Horned lark
Scrub jay
House finch
Red crossbill
Lesser gold finch
Canyon towhee
Rock wren
Clark's nutcracker
Common raven
American crow
Pine grosbeak
Black-headed grosbeak
Killdeer
White-eared hummingbird
Broadtail hummingbird
Thick-billed parrot

Mammals:

Spotted bat
Occult bat
Penasco least chipmunk
New Mexico meadow jumping mouse
Hualapai vole
Navajo mexican vole
Kaibab squirrel
Colorado chipmunk
Meadow jumping mouse
Water shrew

Plants:

White mountain beard tongue
Ripley milk-vetch
Organ Mountain paintbrush
Sacramento mountain thistle
Mogollon clover
New mexico milk-vetch
Tall milk-vetch
Wooton's paintbrush
Small-headed goldenweed
Mescalero pennyroyal
Wooton's alumroot
New Mexico penstemon
Organ mountain figwort

Guild analysis allows individual species' declines to be placed within a larger context. In this case, it indicates that an entire strata of forest birds are declining- those dependent upon overstory and mid-level canopies, mature trees, or snags. The loss of open-cup nesting passerines, for example, is traceable to the disappearance of large trees and high snag densities (Marzluff and Lyon 1983). Neotropical migrants are generally intolerant of habitat fragmentation (Anderson and Robbins 1981, Whitcomb et al. 1981, Lynch and Whigham 1984, Temple 1986). Neotropical migrants, moreover, are very often open-cup nesting passerines as well (Anderson and Robbins 1981). Primary and secondary cavity nesters are closely associated with high densities and good distributions of snags and mature trees (Balda 1975a, Cunningham *et al.* 1980, Scott and Oldemeyer 1983). Permanent residents generally have a narrow habitat range associated with undisturbed forests (Miller 1992). They also overlap substantially with the two cavity nesting guilds and require large snags for winter roosts (Moore 1945, Kendeigh 1960, Hay and Guntert 1963, Sydeman and Gunter 1983).

Bird species diversity and numbers in the Southwest have been positively correlated with the density of mature live ponderosa pines and snags. While these totalled only 5% of the trees on 16 study sites on the Kaibab and Coconino National Forests (site = 16 acres), they harbored 70% of all recorded birds (Keller 1992). The greatest diversity of all bird species present throughout study and forest bird species were in areas with 14 or more mature trees per acre and at least two snags. The lowest diversity was in sites with no mature trees or snags. The greatest number of birds and forest birds were in sites with 8-10 mature pines and no snags[7]. Forest birds comprised 100 of 116 total birds located on these sites. The lowest number of birds and forest birds were in sites with no mature trees or snags. Forest birds made up only 28 of 51 species on these sites.

Snags are used by 85% of North American birds (Scott *et al.* 1977), at least 49 species of mammals, and many reptiles, amphibians and invertebrates (Davis 1983). Thirty percent of all North American birds nest in snags (Morrison *et al.* 1984). In terms of habitat suitability and forest composition, snags are tremendously important to wildlife. Snags, however, are not distributed evenly across habitat types either by density or size class. In the West, large snags are particularly abundant in mature ponderosa pine forests (Balda 1975). Forty bird species nest in ponderosa snags (Scott and Patton 1984). Secondary cavity nesters alone make up 33% of breeding bird species, and 40% of total breeding bird pairs in ponderosa pine forests (Balda 1975b). Eighty two percent of secondary cavity nesters breed exclusively in dead and dying trees (Balda 1975b). Between 60 and 94% of over-wintering ponderosa pine associated birds require snag roosts (Sazaro 1976). In addition to nesting and roosting sites, snags and broken-tops are used as drumming posts, song perches, hawking platforms and foraging substrates.

Large snags are preferred by primary and secondary cavity nesters. Seventy five percent of cavity nests on the Coconino National Forest are in trees measuring greater than or equally to 24" in diameter at breast height (Cunningham *et al.* 1980), while the mean dbh for

[7] That this study found a preference for snags which is significant but lower than is generally found in the ornithological literature, is primarily due to the very low number and species of cavity nesters on the study plots- a sign of forest disturbance.

trees containing cavity nests on the Apache-Sitgreaves National Forest is 23" (Scott 1978). There are many reasons for this preference.

1. Snags larger than 19" are more likely to contain cavities than smaller trees (Scott and Oldemeyer 1983). This in itself could suggest that secondary cavity nesters are not so much selecting for large snags as they are for abundant holes, whereas primary cavity nesters are selecting for large snags. Crocker-Bedford and Pyc (1988), however, found that selection for 6-9" snags "was essentially zero."

2. Cavities in large snags are better insulated than cavities in small snags because they are surrounded by a thicker layer of wood. This is known to induce earlier nesting by great tits. Early nesting means early fledging dates and advanced physiological development, increasing the chances of survival during the first winter (O'Conner 1978). Insulating properties are important to over-wintering birds as well (Moore 1945, Kendeigh 1960, Hay and Guntert 1983, Sydeman and Guntert 1983, Crocker-Bedford and Pyc 1988), especially small songbirds which have a high surface to volume rate. Their winter roosts must be in trees large enough to provide sufficient insulation during cold nights. Many birds, such as pygmy nuthatches, roost communally in order to conserve heat. As many as 167 pygmy nuthatches have roosted in a single cavity (Sydeman and Guntert 1983). A snag must be quite large to provide a enough cavity space and still have a surrounding insulating mass. The mean dbh of winter pygmy nuthatch roosts was 29 inches in one study area (Hay and Guntert 1983). McClelland and Frissell (1975) found that over-wintering birds selected the tallest and widest snags of western larch and paper birch while Moore (1945) suggested this selection was insulation marked.

3. Some passerines increase their clutch size in proportion to size of available nesting cavities (Karlsson and Nilsson 1977) and hence to snag sizes as larger snags support larger cavities.

4. Large snags support higher insect populations (Brawn *et al.* 1982, Raphael and White 1984, Keller 1987) thereby decreasing energy use during the critical nesting period.

5. Large snags tend to stand for longer periods of time than smaller snags (Bull 1983, Keen 1955).

Balda (1975b) recommends that as an absolute minimum, two snags per acre be retained in managed forests to provide for bird use. Crocker-Bedford and Pyc (1988), on the other hand, suggest that basal area per acre (including only snags greater than 9") be used as a measure instead, as it accounts for size as well as number of snags. While they do not attempt to establish a minimum, they clearly indicate that where wildlife are concerned, the more large snags per acre the better

1. Snags fall relatively quickly. Few snags reach 15 years of age and only 10-50% of snags remain upright for 25 years (Keen 1955, Cunningham et al. 1980).

2. Younger snags (5 to 20 years old) are preferred by most cavity nesters (excepting pygmy nuthatches), probably because they have more insects (Baker 1973, Keen 1955). Snags therefore, must be continually created.

3. Not all snags, even apparently suitable snags, are used.

4. A high percentage of cavities are not used, even during the breeding season (Dennis 1971).

5. "Severe" intra and inter-specific competition results from low numbers and poor distribution of snags (Cunningham *et al.* 1980). This situation has been exacerbated by influxes of house sparrows and starlings.

Secondary cavity nesters are not capable of excavating their own cavities. These birds- principally ascines (chickadees, tits, nuthatches and some creepers), wrens, flycatchers, bluebirds, swallows, starlings and warblers- depend upon an abundance of natural cavities or cavities excavated by woodpeckers. The availability of suitable nesting cavities is the primary limiting factor in secondary cavity nester populations sizes (Allen and Nice 1952; Balda 1970, 1975; Burns 1960; Elliot 1945; von Haartman 1957; Power 1966; Zeleny 1972). This is born out by studies showing that where unlimited nesting and roost sites are available, other factors, such as availability of food, do not affect population sizes (MacKenzie 1952).

Mature forests are the most favorable to cavity nesters because of their abundance of large dead and dying trees. The removal of these trees in managed forests dramatically decreases the number and diversity of secondary cavity nesters. The loss of natural bird diversity in managed forests has been well document, closer analysis reveals, however, that the general decline is largely accounted for in the disappearance of cavity nesting species (Haapanen 1965). Of 14 primary cavity nesting birds seen on 16 study plots in southwestern ponderosa forests, only one was observed briefly using an immature tree (Keller 1992). Of 203 observations of secondary cavity nesting birds, only 53 used immature trees. Many bird species were not recorded on sites with 0 or 2-4 mature pines (whether or not snags were present) or on the sites with at least 8 mature pines if snags were not present (Keller 1982). Brown creeper, Townsend's solitaire, western tanager, buff-breasted flycatcher, white-throated swift and three-toed woodpecker appeared only on sites with 8 or more mature pines and at least 2 snags. One species, black-headed grosbeak, appeared only on the site with the greatest canopy closure (19.25 mature trees/acre). No northern goshawks or northern saw-whet owls were found. Mannan and Siegal (1988) found these two species to be absent from the Kaibab National Forest when mature ponderosa pines dropped below 20 trees/acre.

The majority of snag dependent birds in the Southwest are insectivorous (Balda 1975b). One hundred percent of primary cavity nesters and eighty percent of secondary cavity nesters are insectivorous (Cunningham and Balda 1980). All four carnivorous secondary cavity nesters are partially dependent on insects. Indeed, the majority of birds

found in ponderosa pine forests (31 of 37 species in 700 observations) are insectivors (Keller 1992).

They are very important to the maintenance of a balanced insect population (Otvos 1979, Kroll and Fleet 1979) as well as providing a crucial prey base for imperiled species like the Northern goshawk. The five secondary cavity nesters which winter in ponderosa pine forest make up 63-73% of all its winter residents (Balda 1975b). They are the major consumer of winter insects and are therefore important and in controlling spring reproduction rates. Sites on the Coconino and Kaibab National Forests with the greatest densities of insectivorous species (18) had more than 14 mature pines and at least two snags/acre (Keller 1992). The sites with greatest number of insectivorous (106) had 8-10 mature pines and no snags/acre. The sites with the least diversity (8) and numbers (41) of insectivorous contained no mature trees or snags.

Given the high correlation of snags and mature trees with 1) overall bird numbers and diversity, 2) forest bird numbers and diversity, and 3) imperiled bird numbers and diversity, Keller (1992) set up 100 randomly selected four acre transects to determine the density of mature trees and snags on the Coconino National Forest. He found that 73% of the plots had less then one snag/acre and 95% had less than two snags/acre. Snags per acre averaged 0.65. Sixty percent of the transects had less than four mature pines/acre and 85% had less than eight pines/acre. Mature pines per acre averaged 4.8. Even more astounding, of the few mature trees left, 12% were marked for harvest.

V. LIVESTOCK GRAZING IS NOT ADEQUATELY ADDRESSED.

Livestock grazing is known to adversely affect raptors in the Southwest and elsewhere (Kochert *et al.* 1993, Newton 1979). Increases in grazing intensity tend to decrease diversity, though not necessarily absolute density, of small bird, mammal and reptile species:

> Busack and Bury 1974, Damback 1944, Hanley and Page 1982, Jones 1981, Larsson 1969, Monson 1941, Mosconi and Hutto 1982, Olsen 1974, Reynolds and Trost 1980, Taylor 1986, Wiens 1973, Wiens and Dyer 1975.

Loss of prey species diversity make raptors vulnerable to stochastic or systematic events which may decrease numbers of certain species. Maintaining a diverse goshawk prey base is one of the central aims of the MRNG.

In some cases, overall abundance of small mammals and birds may decrease (Crouch 1982, Duff 1979, Taylor 1986). Although grazing may favor some species, in general, few prey species tolerate intensive long-term overgrazing (Anderson-Rice and Smith 1993, Flinders and Hansen 1975, Frank 1950, Hanley and Page 1982, Phillips 1936, Taylor et al. 1935). Species requiring substantial cover (such as *Microtus* spp., *Sigmodon* spp., *Ammodraamus savannarum*, and *Aimophila casinii*) are most likely to be significantly affected (Owens and Meyers 1973, Kirsch *et al.* 1978, Johnson 1982, Bock *et al.* 1984.)

Livestock grazing has been identified a major adverse influence on Southwestern forests and Northern goshawk prey species (Finch 1992, MRNG). The DEIS, however, does not address the adverse effects of livestock grazing on either goshawk prey or habitat. The virtual absence of grazing as an issue in the DEIS reflects a consistent Forest Service refusal to acknowledge that grazing is a tremendous wildlife and forest health problem which needs to be addressed.

Excessive tree density and fire suppression is a dominant theme of the DEIS, yet the authors failed to discuss or even mention the vast body of scientific literature linking overgrazing to increased tree densities, meadow encroachment and reduced fire frequency:

> Bahre 1991, Brawn and Balda 1988, Cooper 1960, Covington and DeBano 1988, Covington and Sackett 1988, Covington and Moore 1992, 1994; Faulk 1970, Harrington 1991, Harrington and Sackett 1988, Humphrey 1958, Hastings and Turner 1965, Madany and West 1983, Martin and Turner 1977, McPherson and Wright 1989, Pieper and Wittie 1988, Rassmussen 1941, Rummell 1951, Stein 1988, Winegar 1977, Wright 1988, Wright and Bailey 1982, Wright *et al.* 1979.

Livestock grazing

> - causes unnatural levels of seedling establishment by removing the grasses and forbs which would naturally compete with seedlings.
>
> - causes meadow encroachment by drying out meadows, thereby making them more suitable to tree growth. Meadows are dried out by ground cover removal, sheet erosion and gullying.
>
> - suppresses fire by removing the flammable grasses and forbs which formerly served as a major fire conduit.

Grazing also adversely affects goshawk habitat in more direct ways. Organic forest soils are reduced or eradicated by excessive livestock grazing (Schulz and Leininger 1990, Kauffman *et al.* 1983). Mineral forest soils are subject to cattle-induced erosion due to loss of ground cover, compaction, decreased infiltration rates and increased runoff:

> Abdel-Magid *et al.* 1987, Alderfer and Robinson 1947, Branson and Owen 1970, Branson *et al.* 1962, 1972; Bryant *et al.* 1972, Cooperrider and Hendricks 1937, Cottam and Evans 1945, Coupland *et al.* 1960, Craddock and Pearse 1938, Davis 1977, Ellison 1960, Gardner 1950, Hanson et al. 1970, Haynes and Neal 1943, Johnston 1962, Kaffman and Krueger 1984, Kaffman *et al.* 1983, Leopold 1942, Leithead 1959, Liacos 1962, Lusby 1970, Lusby *et al.* 1971, Meeuwig 1965, Ohmart and Anderson 1982, Orodho *et al.* 1990, Orr 1960, Packer 1953, Rauzi and Hanson 1966, Rauzi and Smith 1973, Renner 1936, Rhoades *et al.* 1964, Ssartz and Tolsted 1974, Sharp *et al.* 1964, Smiens 1975, Tromble *et al.* 1974.

Loss or reduction of grasses, forbs and shrubs reduces hiding and foraging habitat for goshawk prey species (MRNG). The DEIS presents excessive tree density and canopy closure as the only significant cause of herbaceous and shrubby vegetation loss. Cattle, however, are an obvious and very significant source of shrub and ground cover removal. This is why the MRNG recommends grazing restrictions. The extractive solution to the tree density problem (logging) is clearly more palatable to the Forest than the conservation solution to the ignored grazing problem (reduction).

The MRNG sets specific limits on grazing pressure within goshawk management territories (see Table 8). The interim goshawk guidelines additionally restrict average shrub utilization to 40% (by weight) while setting maximum utilization at 60% within management territories. Most of the National Forests are over the 20% average and many sites are over the 40% maximum (pers. obser.). Recommendations are also presented to maintain well developed herbaceous and shrub understories and soils. The DEIS does not discuss or even mention how the MRNG grazing restrictions will be implemented, what effect they may have, or how they will interact with logging restrictions and other resource issues.

TABLE 8. MRNG DESIRED FUTURE CONDITIONS AND MANAGEMENT RECOMMENDATIONS RELATING TO LIVESTOCK GRAZING.

	NEST AREA	PFA	FORAGING AREA
DESIRED		1. Developed herbaceous	1. Developed herbaceous

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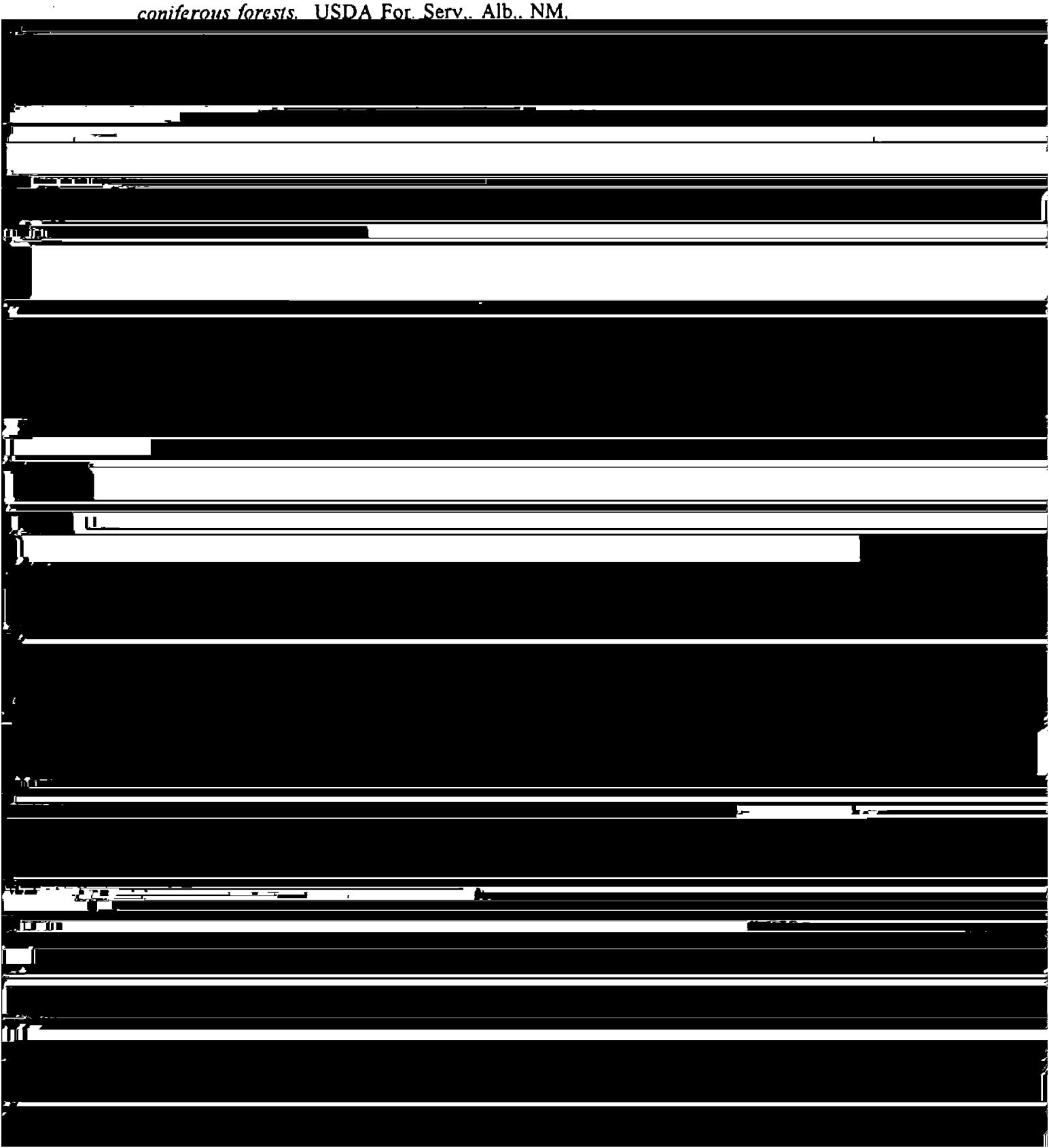

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